
FRBSF WEEKLY LETTER

Number 93-26, July 23, 1993

Interest Rate Risk at U.S. Commercial Banks

During the past few years, the composition of U.S. commercial banks' asset portfolios has changed dramatically. Most notably, holdings of securities have grown over 35 percent since the beginning of 1990, while loans to businesses have actually declined over the same period. Some observers argue that if increases in bank securities holdings are concentrated in longer-term issues, then these portfolio shifts may expose banks to increased interest rate risk, especially if rates rise rapidly.

Unfortunately, it is difficult to assess the interest rate risk exposure of the banking system without detailed information on the maturity and cash flow characteristics of bank assets and liabilities. Federal banking agencies have proposed systems to measure this risk, but the data needed to derive these measures are not yet available.

In this *Weekly Letter*, I provide a preliminary assessment of the interest rate risk of U.S. commercial banks using data that are currently available in bank Call Reports. While the measure I derive is incomplete, it does suggest that some of the concerns about bank interest rate risk may be overstated.

Methodology and assumptions

As part of an ongoing effort to assess bank interest rate risk, the Federal Reserve Board has proposed a risk measurement system that is to be implemented beginning in 1994. Under this proposal, banks will provide detailed data on the maturity and cash flow characteristics of their assets and liabilities. Based on these features, one set of risk weights will be assigned to liabilities, and one set will be assigned to each of three categories of assets: amortizing, nonamortizing, and deep discount. Holdings in each category will be multiplied by the appropriate risk factor, which represents the change in the value of the bank's

position in that category that would result from a shock to interest rates. Netting risk-weighted assets against risk-weighted liabilities, regulators can determine how much a bank's net worth would change in response to a given parallel shift in interest rates. Under the Fed's proposal, banks may be required to hold more capital against interest rate risk if their risk exposure is considered to be "excessive." (For a more detailed description of an earlier, but similar, interest rate risk measure, see *Weekly Letter* 92-39.)

My measure of bank interest rate risk is based on the March 1993 version of the Fed's proposed methodology. However, several compromises were required because banks currently do not report sufficient information to derive the Fed's interest rate risk measure. First, limited maturity data are available from 1988:Q4 on bank holdings of fixed and floating rate loans, securities, and large CDs in each of four time-to-maturity bands. The Fed's proposed risk measure uses seven time bands. These data are the basis for my interest rate risk calculations.

Second, banks do not currently include data on the cash flow characteristics of their assets. However, whether a loan amortizes or not can significantly affect its interest rate risk. In addition, other characteristics, like prepayment options and interest caps on mortgages, also affect the interest rate sensitivity of these assets. To deal with these issues, it was necessary to make several assumptions. First, I assume that all real estate and personal loans are amortizing, while loans for construction and land development, business loans, and loans to other banks are not. I then calculate the proportion of total loans that are amortizing and non-amortizing, and apply these percentages to each of the four loans-by-maturity categories. For securities, I assume that mortgage-backed securities are amortizing, while all others are not and again

WESTERN BANKING

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apply these percentages to the maturity data. The effects of prepayments and other imbedded options are incorporated in the risk-weights proposed by the Fed. In the absence of additional information, I also assume that banks hold no deep-discount assets.

The maturity of deposits is an important issue in determining bank interest rate risk. Deposits with no specific maturity, such as checking and savings accounts, can be thought to have very short maturity since they can be withdrawn on demand. At the same time, however, these deposits are a stable funding source for banks whose rates adjust slowly. Thus, they may have an effective maturity that is quite long. The Fed's proposal gives banks some freedom to allocate their liabilities across the different maturity bands, with guidelines to limit the proportion of deposits in the longer time bands. I follow the proposed guidelines in determining the maturities of bank deposits and other liabilities.

For the risk weights, I use the risk factors in the Fed's most recent proposal. The four time bands for which data are currently available do not match up exactly with the seven bands in the Fed proposal. For the medium-term instruments (1 to 5 years), I use the 3-to-5-year proposed risk weight; for my over 5-year maturity band, I use the Fed's 10-to-20-year risk weight.

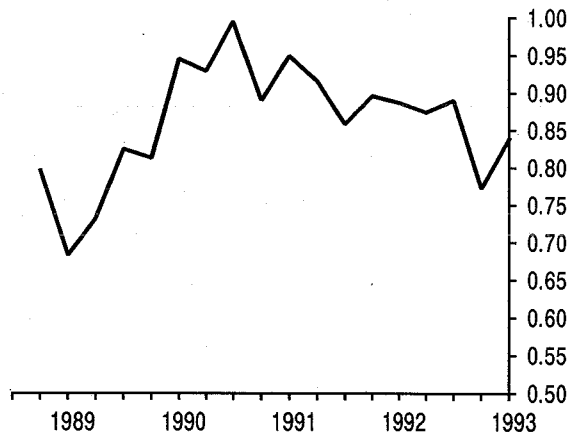
Finally, the measure I derive does not include data on off-balance sheet activities. Unfortunately, there are no data to characterize bank's off-balance sheet activities or to determine their maturities. While some argue that off-balance sheet positions pose considerable interest rate risk, others suggest that banks use these activities to hedge against interest rate risks in other positions. The net effect of this omission, therefore, is uncertain.

Results

Using the methodology described above, I estimate the effect on the U.S. commercial banking system of a 200-basis-point across-the-board increase in interest rates. While the effect of interest rate changes would differ if rates rose less or if they fell, this scenario addresses the effect of a large unanticipated positive shock to all interest rates. The interest rate risk measure is the net risk-weighted position, defined as the change in

Net Risk-Weighted Position as a Percent of Total Assets

(+200 basis point shock to interest rates)



bank net worth resulting from the 200-basis-point rise in all interest rates, divided by total bank assets. Thus, a value of 1.0 would indicate that a 200-basis-point increase in rates would reduce bank net worth by 1 percent of assets. The results of this calculation are presented in the figure for the period from 1988.Q4 to 1993.Q1.

According to this measure, the interest rate risk exposure of U.S. banks' on-balance sheet activities is 0.85 percent of assets as of early 1993. Since some interest rate risk is inherent in banking, this exposure does not seem "excessive." In fact, the Fed has suggested that interest rate risk below 1 percent of assets is within industry norms. The data suggest that interest rate risk among banks as a group has not increased much in recent years. In fact, the figure shows a slight downward trend in interest rate risk since mid-1990.

Thus, there is evidence that recent portfolio shifts at U.S. banks have not resulted in an increased exposure to interest rate risk. This conclusion comes with two caveats. First, aggregation of individual bank balance sheets may conceal increases in interest rate risk at individual banks. While the figures for the industry as a whole indicate no real systematic shift in interest rate risk among banks, this does not preclude jumps in interest rate exposures at individual institutions. Second, the results presented here omit bank off-balance sheet activities. A better assessment of the risk-enhancing or risk-reducing effects of these activities will have to await the availability of better data from the banking system.

Jonathan A. Neuberger
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REGIONAL BANK DATA

MARCH 31, 1993

(NOT SEASONALLY ADJUSTED, PRELIMINARY DATA)

| | | DISTRICT | ALASKA | ARIZ. | CALIF. | HAWAII | IDAHO | NEVADA | OREGON | UTAH | WASH. |
|-------------------------------|---------------------|--|--------|--------|---------|--------|--------|--------|--------|--------|--------|
| | | ASSETS AND LIABILITIES - \$ MILLION (ALL COMMERCIAL BANKS) | | | | | | | | | |
| ASSETS | TOTAL | 490,447 | 4,843 | 35,692 | 324,176 | 22,258 | 10,128 | 13,641 | 25,247 | 14,421 | 40,040 |
| | FOREIGN (RESIDUAL) | 28,927 | 0 | 0 | 26,438 | 2,393 | 0 | 0 | 0 | 64 | 32 |
| | DOMESTIC | 461,520 | 4,843 | 35,692 | 297,738 | 19,865 | 10,128 | 13,641 | 25,247 | 14,358 | 40,008 |
| LOANS | TOTAL | 328,652 | 2,273 | 19,808 | 223,699 | 13,792 | 6,756 | 7,234 | 17,153 | 8,440 | 29,497 |
| | FOREIGN (RESIDUAL) | 28,036 | 5 | 0 | 26,644 | 1,355 | 0 | 0 | 0 | 0 | 52 |
| | DOMESTIC | 300,616 | 2,268 | 19,808 | 197,054 | 12,458 | 6,756 | 7,234 | 17,153 | 8,440 | 29,445 |
| | REAL ESTATE | 159,749 | 1,071 | 6,978 | 116,483 | 7,303 | 2,129 | 2,412 | 7,073 | 3,307 | 12,992 |
| | COMMERCIAL | 62,024 | 716 | 2,677 | 39,235 | 3,261 | 1,505 | 802 | 4,465 | 1,615 | 7,747 |
| | CONSUMER | 53,845 | 350 | 6,014 | 27,841 | 1,076 | 2,041 | 3,879 | 3,530 | 2,779 | 6,896 |
| | AGRICULTURE | 5,308 | 4 | 318 | 2,803 | 30 | 626 | 12 | 397 | 151 | 967 |
| | INTERNATIONAL | 85 | 0 | 8 | 77 | 0 | 0 | 0 | 0 | 0 | 0 |
| SECURITIES | TOTAL | 74,301 | 1,995 | 8,645 | 40,423 | 5,049 | 2,036 | 3,825 | 4,401 | 3,636 | 4,290 |
| | U.S.T.S. | 24,082 | 875 | 2,736 | 11,842 | 2,817 | 463 | 1,676 | 1,387 | 835 | 1,451 |
| | SECONDARY MARKET | 38,526 | 613 | 4,975 | 23,193 | 1,710 | 910 | 1,719 | 2,158 | 1,817 | 1,430 |
| | OTHER SEC. | 11,693 | 508 | 934 | 5,388 | 522 | 663 | 429 | 856 | 985 | 1,409 |
| LIABILITIES | TOTAL | 448,153 | 4,226 | 32,305 | 297,278 | 20,609 | 9,376 | 12,002 | 22,883 | 13,109 | 36,365 |
| | DOMESTIC | 419,220 | 4,226 | 32,305 | 270,835 | 18,215 | 9,376 | 12,002 | 22,883 | 13,046 | 36,333 |
| DEPOSITS | TOTAL | 394,477 | 3,543 | 29,340 | 285,750 | 14,794 | 7,787 | 9,571 | 20,181 | 10,522 | 32,990 |
| | FOREIGN (RESIDUAL) | 26,781 | 0 | 0 | 24,498 | 2,188 | 0 | 0 | 0 | 64 | 32 |
| | DOMESTIC | 367,696 | 3,543 | 29,340 | 241,252 | 12,606 | 7,787 | 9,571 | 20,181 | 10,458 | 32,958 |
| | DEMAND | 88,812 | 997 | 5,915 | 61,820 | 2,352 | 1,358 | 2,475 | 3,966 | 2,111 | 7,818 |
| | TIME AND SAVINGS | 278,884 | 2,545 | 23,425 | 179,432 | 10,254 | 6,429 | 7,096 | 16,216 | 8,346 | 25,139 |
| | NOW | 41,200 | 330 | 3,434 | 24,508 | 1,479 | 1,017 | 1,289 | 3,194 | 1,490 | 4,460 |
| | MMDA | 94,076 | 538 | 7,582 | 65,902 | 1,939 | 1,590 | 2,370 | 4,358 | 1,776 | 8,021 |
| | SAVINGS | 44,735 | 689 | 3,407 | 27,193 | 3,126 | 991 | 1,572 | 2,206 | 1,688 | 3,864 |
| | SMALL TIME | 68,030 | 444 | 7,528 | 39,464 | 2,065 | 2,239 | 1,045 | 5,517 | 2,693 | 7,035 |
| | LARGE TIME | 30,656 | 507 | 1,475 | 22,291 | 1,642 | 592 | 819 | 935 | 698 | 1,697 |
| OTHER BORROWINGS | | 31,979 | 639 | 2,396 | 14,143 | 5,215 | 1,427 | 1,357 | 2,136 | 2,334 | 2,332 |
| EQUITY CAPITAL | | 42,293 | 617 | 3,387 | 26,897 | 1,649 | 751 | 1,639 | 2,364 | 1,312 | 3,675 |
| LOAN LOSS RESERVE | | 10,204 | 40 | 556 | 7,599 | 240 | 108 | 400 | 450 | 198 | 613 |
| LOAN COMMITMENTS | | 196,628 | 660 | 28,638 | 121,232 | 6,297 | 3,279 | 1,941 | 10,231 | 7,135 | 17,214 |
| LOANS SOLD | | 15,630 | 25 | 153 | 14,805 | 228 | 25 | 68 | 190 | 51 | 86 |
| | | EARNINGS AND RETURNS - \$ MILLION, YEAR-TO-DATE (ALL COMMERCIAL BANKS) | | | | | | | | | |
| INCOME | TOTAL | 11,228 | 103 | 743 | 7,309 | 429 | 211 | 572 | 621 | 326 | 913 |
| | INTEREST | 8,495 | 84 | 585 | 5,564 | 377 | 179 | 283 | 449 | 257 | 718 |
| | FEES & CHARGES | 735 | 6 | 57 | 492 | 12 | 14 | 16 | 47 | 22 | 70 |
| EXPENSES | TOTAL | 9,212 | 72 | 662 | 6,130 | 334 | 162 | 420 | 482 | 251 | 699 |
| | INTEREST | 2,809 | 24 | 209 | 1,811 | 154 | 69 | 72 | 145 | 90 | 235 |
| | SALARIES | 2,330 | 24 | 189 | 1,589 | 85 | 32 | 53 | 144 | 54 | 181 |
| | LOAN LOSS PROVISION | 846 | 2 | 48 | 628 | 16 | 5 | 86 | 21 | 12 | 28 |
| | OTHER | 3,227 | 22 | 236 | 2,102 | 80 | 56 | 209 | 171 | 95 | 256 |
| INCOME BEFORE TAXES | | 2,016 | 31 | 81 | 1,179 | 95 | 49 | 152 | 139 | 75 | 214 |
| TAXES | | 780 | 9 | 28 | 495 | 34 | 18 | 51 | 49 | 25 | 70 |
| NET INCOME | | 1,277 | 21 | 40 | 765 | 66 | 26 | 98 | 80 | 46 | 135 |
| ROA (%) | | 1.05 | 1.81 | 0.45 | 0.94 | 1.17 | 1.06 | 2.95 | 1.28 | 1.32 | 1.35 |
| ROE (%) | | 12.08 | 13.82 | 4.74 | 11.37 | 15.94 | 14.07 | 23.90 | 13.55 | 14.03 | 14.69 |
| NET INTEREST MARGIN (%) | | 4.66 | 5.09 | 4.25 | 4.63 | 3.98 | 4.42 | 6.37 | 4.86 | 4.79 | 4.85 |
| | | ASSET QUALITY - PERCENT OF LOANS (LARGE COMMERCIAL BANKS) | | | | | | | | | |
| LOAN LOSS RESERVE (ALL BANKS) | | 3.10 | 1.77 | 2.81 | 3.40 | 1.74 | 1.61 | 5.52 | 2.62 | 2.35 | 2.08 |
| NET CHARGEOFFS, TOTAL | | 1.00 | 0.23 | 0.74 | 1.19 | 0.16 | 0.18 | 2.88 | 0.55 | 0.18 | 0.34 |
| | REAL ESTATE | 0.79 | -0.08 | 0.28 | 1.01 | 0.09 | 0.01 | 0.30 | 0.38 | 0.15 | 0.18 |
| | COMMERCIAL | 0.41 | 0.54 | 0.57 | 0.49 | 0.13 | 0.07 | 5.29 | 0.11 | -0.70 | -0.13 |
| | CONSUMER | 2.91 | 0.57 | 1.83 | 4.08 | 0.76 | 0.49 | 3.95 | 1.68 | 0.77 | 1.12 |
| | AGRICULTURE | -0.02 | 0.00 | 0.52 | -0.15 | 0.00 | 0.15 | -0.09 | -0.13 | -0.11 | 0.12 |
| PAST DUE & NON-ACCRUAL, TOTAL | | 5.57 | 2.90 | 4.13 | 6.48 | 3.35 | 1.93 | 7.41 | 2.43 | 1.97 | 4.13 |
| | REAL ESTATE | 7.30 | 3.05 | 6.64 | 8.32 | 3.44 | 2.43 | 8.88 | 2.47 | 2.65 | 5.37 |
| | CONSTRUCTION | 20.65 | 3.35 | 18.85 | 23.17 | 11.82 | 9.29 | 22.67 | 5.13 | 3.01 | 17.72 |
| | COMMERCIAL | 7.59 | 3.02 | 11.68 | 8.98 | 1.33 | 2.43 | 7.46 | 3.35 | 3.47 | 3.21 |
| | FARM | 8.49 | 0.00 | 20.57 | 9.19 | 11.33 | 3.37 | 0.00 | 5.59 | 10.85 | 2.73 |
| | 1-4 FAMILY REV | 1.13 | 1.14 | 0.59 | 1.20 | 1.51 | 0.51 | 0.50 | 0.33 | 0.68 | 1.18 |
| | 1-4 FAMILY OTHER | 3.05 | 2.28 | 2.54 | 3.42 | 3.72 | 1.17 | 3.49 | 0.98 | 1.31 | 1.34 |
| | MULTI-FAMILY | 8.18 | 1.17 | 10.90 | 9.70 | 1.13 | 0.74 | 27.13 | 0.92 | 0.18 | 2.83 |
| | COMMERCIAL | 5.46 | 2.59 | 6.39 | 6.12 | 4.04 | 1.47 | 13.31 | 2.39 | 2.43 | 3.86 |
| | CONSUMER | 3.34 | 2.39 | 2.70 | 3.90 | 2.49 | 1.39 | 5.78 | 1.69 | 1.04 | 2.59 |
| | AGRICULTURE | 5.62 | 0.00 | 8.01 | 5.88 | 26.88 | 4.50 | 4.21 | 5.42 | 1.88 | 4.39 |
| NUMBER OF BANKS | | 742 | 8 | 38 | 447 | 17 | 20 | 18 | 48 | 54 | 92 |
| NUMBER OF EMPLOYEES | | 245,225 | 2,676 | 19,505 | 159,806 | 8,474 | 4,652 | 6,212 | 16,234 | 7,159 | 20,707 |

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MARKET SHARE STATISTICS

DEPOSITORY INSTITUTIONS REQUIRED TO HOLD RESERVES WITH THE FEDERAL RESERVE ON A WEEKLY BASIS

PERCENT OF COMBINED MARKET TOTAL FOR MAY 1993, BY REGION

| DEPOSIT TYPE | DISTRICT | | | ALASKA | | | ARIZONA | | | CALIF | | | HAWAII | | | IDAHO | | | NEVADA | | | OREGON | | | UTAH | | | WASH | | |
|-----------------|----------|----|----|--------|----|----|---------|----|----|-------|----|----|--------|----|----|-------|----|----|--------|----|----|--------|----|----|------|----|----|------|----|----|
| | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU | CB | SL | CU |
| TOTAL DEPOSITS | 55 | 39 | 7 | 71 | 4 | 25 | 92 | 1 | 7 | 48 | 46 | 6 | 65 | 30 | 5 | 91 | 5 | 4 | 76 | 21 | 3 | 81 | 10 | 9 | 79 | 5 | 16 | 56 | 35 | 9 |
| DEMAND | 90 | 6 | 4 | 99 | 0 | 1 | 96 | 0 | 4 | 89 | 6 | 5 | 90 | 3 | 7 | 95 | 0 | 5 | 97 | 3 | 0 | 95 | 1 | 4 | 89 | 5 | 6 | 83 | 15 | 2 |
| NOW | 64 | 28 | 8 | 57 | 6 | 37 | 89 | 0 | 11 | 57 | 36 | 7 | 66 | 31 | 3 | 92 | 3 | 4 | 78 | 16 | 6 | 84 | 8 | 9 | 82 | 2 | 16 | 65 | 23 | 11 |
| SAVINGS & MMDAS | 60 | 31 | 9 | 55 | 5 | 41 | 90 | 0 | 10 | 56 | 37 | 7 | 59 | 34 | 7 | 92 | 4 | 4 | 79 | 16 | 5 | 77 | 10 | 13 | 72 | 3 | 25 | 57 | 27 | 17 |
| SMALL TIME | 32 | 65 | 3 | 75 | 8 | 17 | 95 | 1 | 4 | 23 | 74 | 3 | 54 | 44 | 2 | 88 | 11 | 1 | 43 | 53 | 3 | 77 | 17 | 6 | 81 | 11 | 8 | 39 | 57 | 5 |
| LARGE TIME | 43 | 47 | 10 | 96 | 2 | 3 | 91 | 0 | 9 | 37 | 52 | 11 | 70 | 23 | 7 | 90 | 6 | 5 | 85 | 15 | 0 | 76 | 12 | 12 | 73 | 8 | 19 | 44 | 54 | 2 |

CB = COMMERCIAL BANKS; SL = SAVINGS & LOANS AND SAVING BANKS; CU = CREDIT UNIONS; MAY NOT SUM TO 100% DUE TO ROUNDING

INTEREST RATES ON DEPOSITS AND LOANS AS OF MAY 1993 (%)

| TYPE OF ACCOUNT OR LOAN | DATE | US | DISTRICT | ARIZ | CALIF | HAWAII | IDAHO | OREGON | UTAH | WASH |
|-----------------------------------|--------------------|-------|----------|------|-------|--------|-------|--------|-------|-------|
| SAVINGS ACCOUNTS AND MMDAS | MAR 93 | 2.73 | 2.87 | 2.54 | 2.59 | 3.03 | 3.33 | 2.71 | 3.09 | 2.98 |
| | APR 93 | 2.68 | 2.81 | 2.59 | 2.56 | 2.81 | 3.27 | 2.61 | 2.99 | 2.94 |
| | MAY 93 | 2.65 | 2.78 | 2.57 | 2.54 | 2.84 | 3.20 | 2.50 | 2.97 | 2.91 |
| 92 TO 182 DAYS CERTIFICATES | MAR 93 | 3.03 | 2.93 | 2.70 | 2.85 | 2.50 | 3.09 | 2.99 | 3.05 | 3.25 |
| | APR 93 | 2.99 | 2.89 | 2.76 | 2.82 | 2.33 | 3.00 | 2.92 | 3.05 | 3.24 |
| | MAY 93 | 2.98 | 2.87 | 2.74 | 2.80 | 2.25 | 2.98 | 2.96 | 3.04 | 3.13 |
| 2-1/2 YEARS AND OVER CERTIFICATES | MAR 93 | 4.52 | 4.34 | 3.83 | 3.95 | 4.16 | 5.08 | 5.01 | 4.39 | 4.48 |
| | APR 93 | 4.47 | 4.33 | 3.92 | 3.94 | 4.19 | 4.90 | 5.01 | 4.39 | 4.56 |
| | MAY 93 | 4.45 | 4.27 | 3.81 | 3.91 | 4.11 | 4.90 | 4.95 | 4.34 | 4.54 |
| COMMERCIAL, SHORT TERM* | AVE. RATE | 4.80 | 5.20 | 6.72 | 4.92 | 6.69 | 7.37 | 6.49 | 4.97 | 5.61 |
| | AVE. MAT. (DAYS) | 50 | 84 | N/A | 264 | N/A | N/A | N/A | 35 | N/A |
| COMMERCIAL, LONG-TERM* | AVE. RATE | 6.32 | 9.41 | N/A | N/A | N/A | N/A | N/A | 8.41 | N/A |
| | AVE. MAT. (MONTHS) | 42 | 46 | N/A | N/A | N/A | N/A | N/A | 48 | N/A |
| LOANS TO FARMERS* | AVE. RATE | 7.52 | 6.72 | 6.56 | 6.63 | N/A | 8.07 | 6.82 | 8.71 | 6.90 |
| | AVE. MAT. (MONTHS) | 15 | 14 | N/A | 14 | N/A | N/A | N/A | 7 | N/A |
| CONSUMER, AUTOMOBILE | AVE. RATE | 8.17 | 8.23 | 8.4 | 7.84 | N/A | N/A | 8.02 | 8.88 | 8.17 |
| CONSUMER, PERSONAL | AVE. RATE | 13.63 | 13.87 | 15 | 18.19 | N/A | N/A | 9.21 | 13.65 | 11.84 |
| CONSUMER, CREDIT CARDS | AVE. RATE | 17.15 | 17.6 | 14.9 | 18.38 | N/A | N/A | 19.25 | 14.9 | 18.3 |

SOURCES: SURVEY OF TERMS OF BANK LENDING AND TERMS OF CONSUMER CREDIT; MOST COMMON INTEREST RATES ON SELECTED ACCOUNTS.

* DATA ARE COMPOUNDED ANNUAL RATES.